**3GPP TSG-CT WG4 Meeting #111-eC4-224xxx**

**E-Meeting, 18th – 26th August 2022 *Revision of C4-224292***

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **29.274** | **CR** | **2062** | **rev** | **1** | **Current version:** | **17.6.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Removal of unecessary LTE-M satellite Indication | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | IoT\_SAT\_ARCH\_EPS | | | | |  | ***Date:*** | | | 2022-07-04 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | *LTE-M Satellite Indication* IE is removed in S1-AP UE CAPABILITY INFO INDICATION message because the MME can determine the RAT TYPE (LTE-M satellite access or LTE-M terrestrial access) based on the LTE-M Indication and the terrestrial WB-E-UTRAN or satellite WB-E-UTRAN information from RAN.  The requirement in 3GPP TS 23.401 is also rectified to remove the sending of LTE-M Satellite Indication between MMEs. As RAT Type is not sent from source AMF to target AMF, it is still valid to include the LTE-M Satellite UE Indication (LTEMSUI) in the forward relocation request message. | | | | | | | | |
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| ***Summary of change:*** | | 1. Updates the description on how to determine the LTE-M satellite related RAT Types; 2. Remove Satellite UE indication in context response message. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Misalignment with stage2.  LTE-M satellite related RAT Types determination will be incorect as no LTE-M Satellite UE indication will be received from RAN. | | | | | | | | |
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| ***Clauses affected:*** | | 7.2.7, 7.3.6, 8.17 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

### 7.2.7 Modify Bearer Request

The direction of this message shall be from MME/S4-SGSN to SGW and/or from SGW to PGW (see Table 6.1-1).

The Modify Bearer Request message shall only be sent on the S11 interface by the MME to the SGW and on the S5/S8 interfaces by the SGW to the PGW as part of the procedures:

- E-UTRAN Tracking Area Update without SGW Change

- UE triggered Service Request

- S1-based Handover

- UTRAN Iu mode to E-UTRAN Inter RAT handover

- GERAN A/Gb mode to E-UTRAN Inter RAT handover

- Tracking Area Update procedure with a RAT type change

- E-UTRAN Initial Attach

- Handover from Trusted or Untrusted Non-3GPP IP Access to E-UTRAN with GTP on S5/S8 interface (see clauses 8.2, 8.6 and 16.11 of 3GPP TS 23.402 [45])

- UE requested PDN connectivity

- 3G SGSN to MME combined hard handover and SRNS relocation procedure

- X2-based handover without SGW relocation

- UTRAN/GERAN to E-UTRAN SRVCC

- HSS-based P-CSCF restoration for 3GPP access (see 3GPP TS 23.380 [61])

- Connection Resume procedure (see clause 5.3.5A of 3GPP TS 23.401 [3])

- reception of the RRC establishment cause "MO Exception data" in the NB-IoT RAT

It shall also only be sent on the S11 interface by the MME to the SGW as part of the procedure:

- E-UTRAN Initiated E-RAB modification procedure

- Handover from Trusted or Untrusted Non-3GPP IP Access to E-UTRAN with PMIP on S5/S8 interface (see clauses 8.2 and 16.11 of 3GPP TS 23.402 [45])

- Tracking Area Update procedure with Serving GW change and data forwarding

- Mobile Originated Data transport in Control Plane CIoT EPS optimisation with P-GW connectivity

- Mobile Terminated Data Transport in Control Plane CIoT EPS optimisation with P-GW connectivity

- Establishment of S1-U bearer during Data Transport in Control Plane CIoT EPS optimisation procedure (see clause 5.3.4B.4 of 3GPP TS 23.401 [3]).

It shall also only be sent on the S4 interface by the SGSN to the SGW and on the S5/S8 interfaces by the SGW to the PGW as part of the procedures:

- Routeing Area Update with MME interaction and without SGW change

- E-UTRAN to UTRAN Iu mode Inter RAT handover

- E-UTRAN to GERAN A/Gb mode Inter RAT handover

- Inter SGSN Routeing Area Update Procedure and Combined Inter SGSN RA / LA Update to S4 SGSNs without SGW change

- Iu mode RA Update Procedure without SGW change

- Serving RNS Relocation Procedure

- Combined Hard Handover and SRNS Relocation Procedure

- Combined Cell / URA Update and SRNS Relocation Procedure

- Enhanced Serving RNS Relocation without SGW relocation

- UE Initiated Service Request Procedure

- Iu mode to A/Gb mode Intra SGSN Change

- A/Gb mode to Iu mode Intra SGSN Change

- Iu mode to A/Gb mode Inter-SGSN Change

- A/Gb mode to Iu mode Inter-SGSN Change

- Paging Response with no established user plane on S4

- PDP Context Activation Procedure

- Handover from Trusted or Untrusted Non-3GPP IP Access to UTRAN/GERAN with GTP on S5/S8 interface (see clauses 8.2, 8.6 and 16.11 of 3GPP TS 23.402 [45])

- UTRAN/GERAN to UTRAN (HSPA) SRVCC

- HSS-based P-CSCF restoration for 3GPP access (see 3GPP TS 23.380 [61])

It shall also only be sent on the S4 interface by the SGSN to the SGW as part of the procedures:

- RAB Assignment Procedure

- SRVCC from E-UTRAN to UTRAN or GERAN with DTM HO support procedures and SRVCC from UTRAN (HSPA) to UTRAN or GERAN with DTM HO support.

- Handover from Trusted or Untrusted Non-3GPP IP Access to UTRAN/GERAN with PMIP on S5/S8 interface (see clauses 8.2 and 16.11 of 3GPP TS 23.402 [45])

- Routeing Area Update procedure with Serving GW change and data forwarding

and only on the S5/S8 interfaces by the SGW to the PGW as part of the procedures:

- Tracking Area Update procedure with SGW change

- Gn/Gp SGSN to S4 SGSN Routing Area Update

- X2 based handover with SGW relocation

- Gn/Gp SGSN to MME Tracking Area Update

- Enhanced Serving RNS Relocation with SGW relocation

- Routeing Area Update with MME interaction and with SGW change

- Inter SGSN Routeing Area Update Procedure and Combined Inter SGSN RA / LA Update using S4 with SGW change

- Iu mode RA Update Procedure using S4 with SGW change

- Restoration of PDN connections after an SGW failure if the MME/SGSN and PGW support these procedures as specified in 3GPP TS 23.007 [17]

- MME triggered Serving GW relocation

- S4-SGSN triggered Serving GW relocation

- PGW Pause of Charging procedure

and on the S2b interface by the ePDG to the PGW as part of the procedures:

- UE initiated IPsec tunnel update procedure

If the optional network triggered service restoration feature is supported by the MME, SGSN and SGW, then the Modify Bearer Request message shall also be sent as part of the network triggered service restoration procedure with ISR during an intra MME TAU and an intra S4-SGSN RAU procedure for UEs that had ISR active before either the MME or the S4-SGSN has restarted, as specified in 3GPP TS 23.007 [17]:

- on the S11 interface by the MME to the SGW, if the MME detected that the ISR associated S4-SGSN has restarted and UE performs a TAU procedure;

- on the S4 interface by the S4-SGSN to the SGW, if the S4-SGSN detected that the ISR associated MME has restarted and UE performs a RAU procedure.

This message can be used as an implicit resume of the suspended bearers in the SGW and in the PGW (see 3GPP TS 23.216 [43] clauses 6.2.2.1 and 6.3.2.1, 3GPP TS 23.272 [21] clauses 6.3, 6.5 and 7.4). A Modify Bearer Request used as an implicit resume can contain zero or more IE(s), depending on the conditions of presence of the IEs specified in table 7.2.7-1. The PGW should not consider a Modify Bearer Request with zero IE as an error.

The Modify Bearer Request message may also be sent in the following cases from the S4-SGSN to the SGW/PGW to report a change of Serving Network, User CSG Information or/and UE Time Zone which occured during a previous RAU procedure without SGSN change but which has not been reported yet to the SGW/PGW, or to indicate to the PGW that the UE is available for signalling if the PDN connection is delay tolerant and if there is pending network initiated PDN connection signalling:

- during a Service Request procedure to establish data radio bearers for the corresponding PDP context for a UE in UTRAN with an existing S4-U tunnel;

- when the SGSN receives an uplink LLC PDU for user data or any valid LLC frame serving as a paging response from a UE in GERAN with an existing S4-U tunnel.

The Modify Bearer Request message may also be sent in the following cases from the S4-SGSN to the SGW/PGW to report a change of User Location Information which occured during a previous RAU procedure without SGSN change but which has not been reported yet to the SGW/PGW, if the S4-SGSN is configured to defer the reporting of ULI change until a RAB/user plane is established:

- during a Service Request procedure to establish data radio bearers for the corresponding PDP context for a UE in UTRAN with an existing S4-U tunnel;

- when the SGSN receives an uplink LLC PDU for user data or any valid LLC frame serving as a paging response for a UE in GERAN with an existing S4-U tunnel.

NOTE 1: the S4-SGSN can alternatively send a Change Notification Request message in the above cases, if no other information which requires the sending of a Modify Bearer Request, needs to be reported to the PGW.

The Modify Bearer Request message may also be sent by the MME to the SGW/PGW to report a change of Serving Network, User Location Information, User CSG Information, UE Time Zone or/and RAT Type, when user data is transported in NAS signalling, for a UE with an existing S11-U tunnel.

When requesting the PGW to pause or unpause charging for a PDN connection, the SGW shall wait for the PGW acknowledgement (i.e. Modify Bearer Response) before sending a new pause or unpause request.

NOTE 2: this ensures that the PGW always act per the most recent SGW request in particular in scenarios where the SGW would need to request the PGW to pause and unpause charging in a row (or vice-versa) and the Modify Bearer Request messages would arrive out of order at the PGW.

Upon receipt of a request from the PGW/PCRF/OCS in a message other than Create Bearer Request and Update Bearer Request to report changes of UE presence in new or modified Presence Reporting Area(s), the MME/S4-SGSN shall immediately send a Modify Bearer Request message or a Change Notification Request message to report to the PGW whether the UE is inside or outside the new or modified Presence Reporting Area(s) or whether the Presence Reporting Area(s) is inactive.

The MME/S4-SGSN shall also send a Modify Bearer Request message or a Change Notification Request message to report any subsequent change of UE presence in the Presence Reporting Area, as specified in 3GPP TS 23.401 [3] and 3GPP TS 23.060 [35].

If the Modify Bearer Request message is sent from the old MME/SGSN as part of Tracking/Routeing Area Update procedure with SGW change and data forwarding as specified in clause 5.3.3.1A of 3GPP TS 23.401 [3], the old MME/SGSN shall only include the Bearer Contexts to be modified IE.

NOTE 3: Since the UE has left the old MME/SGSN, some information related to the UE, e.g. ULI, UE Time Zone, CSG, RAT Type in the old MME/SGSN are not valid any more.

Upon receipt of a Modify Bearer Request message that includes the Presence Reporting Area Information from the MME/S4-SGSN, the SGW shall send a Modify Bearer Request message on the S5/S8 interface if any of the following condition is met:

- ISR is not active;

- ISR is active, and the RAT Type has changed since last reported or the CPRAI flag has been set to 1.

The MME shall increment the "MO Exception data counter" by one each time the MME has received the RRC cause "MO Exception data". The MME may defer sending a Modify Bearer Request message to report a non-zero value for the MO Exception Data Counter based on local configuration.

Upon receipt of a Modify Bearer Request message that includes the Secondary RAT Usage Data Report from the MME, the SGW shall send a Modify Bearer Request message on the S5/S8 interface if the IRPGW flag is set to 1 in the Secondary RAT Usage Data Report IE.

Table 7.2.7-1: Information Elements in a Modify Bearer Request

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| ME Identity (MEI) | C | If an SGW receives this IE from an MME/SGSN during a TAU/RAU/Handover procedure, the SGW shall forward it across the S5/S8 interface to the PGW. | MEI | 0 |
| O | The MME/SGSN should include this IE on the S11/S4 interface if the IMSI is not available. The SGW shall forward it across the S5/S8 interface to the PGW if received. See NOTE 23. |
| User Location Information (ULI) | C | The MME/SGSN shall include this IE for the TAU/RAU/Handover procedures if the PGW/PCRF has requested location information change reporting and MME/SGSN support location information change reporting.  An MME/SGSN which supports location information change shall include this IE for UE-initiated Service Request and UE initiated Connection Resume procedures if the PGW/PCRF has requested location information change reporting and the UE's location info has changed.  See NOTE 5, NOTE 17.  The MME shall include the ECGI and/or TAI, or TAI and Macro eNB ID, or Macro eNB ID depending on the Change Reporting Action provided to the MME. The SGSN shall include either the CGI or SAI or RAI, or CGI/SAI together with RAI in the ULI depending on the Change Reporting Action provided to the SGSN.  When ISR is active, the MME/SGSN which supports location information change shall include this IE for UE-initiated Service Request procedure, if the PGW/PCRF has requested location information change reporting. | ULI  (NOTE 15) | 0 |
| CO | This IE shall also be included on the S4/S11 interface for a TAU/RAU/Handover with MME/SGSN change without SGW change procedure, if the level of support (User Location Change Reporting and/or CSG Information Change Reporting) changes.  The MME shall include the ECGI and /or TAI in the ULI, the S4-SGSN shall include either the CGI or SAI or RAI, or CGI/SAI together with RAI in the ULI. See NOTE 10. |
| CO | This IE shall also be included on the S4/S11 interface for a handover procedure with SGW change procedure if  - the level of support (User Location Change Reporting and/or CSG Information Change Reporting) changes; or  - the target MME/S4-SGSN can not derive the level of support (User Location Change Reporting and/or CSG Information Change Reporting) for the source Gn/Gp SGSN. See NOTE 14.  The MME shall include the ECGI and /or TAI in the ULI, the S4-SGSN shall include either the CGI or SAI or RAI, or CGI/SAI together with RAI in the ULI. See NOTE 10. |
| CO | This IE shall also be included on the S11/S4 interface during the following procedures if the MME/SGSN is configured to defer the reporting of ULI change until an E-RAB/RAB/ user plane is established, the ULI has changed during previous mobility procedures i.e. intra MME/S4-SGSN TAU/RAU, and the change has not been reported to the PGW yet:  - UE initiated Service Request, TAU or RAU with a request to establish data radio bearers;  - when the SGSN receives an uplink LLC PDU for user data or any valid LLC frame serving as a paging response for a UE in GERAN with an existing S4-U tunnel. |
| CO | This IE shall also be included on the S4/S11 interface for:  - a TAU/Handover procedure with an S4-SGSN interaction, if the MME supports location information change reporting;  - a RAU/Handover procedure with an MME interaction, if the SGSN supports location information change reporting.  The MME shall include the ECGI and TAI in the ULI. The S4-SGSN shall include the RAI and, if available, the CGI/SAI information, in the ULI. |
| CO | When ISR is not active, the SGW shall include this IE on S5/S8 if it receives the ULI from MME/SGSN.  When ISR is active, the SGW shall include this IE on S5/S8 if  - it receives the ULI from MME/S4-SGSN and the RAT Type has changed since last reported; or  - it receives the ULI from MME/S4-SGSN and the CLII flag has been set to 1. |
| CO | This IE shall also be included by the MME on the S11 interface if the MME supports User Plane Integrity Protection, User Plane integrity protection has been required for the traffic of the PDN connection and the UE is moving to an E-UTRAN that does not support User Plane integrity protection with EPS. |
| Serving Network | CO | This IE shall be included on S11/S4 interface during the following procedures:  - TAU/RAU/handover if Serving Network is changed.  - TAU/RAU when the UE was ISR activated which is indicated by ISRAU flag.  - UE triggered Service Request when UE is ISR activated.  - UE initiated Service Request if ISR is not active, but the Serving Network has changed during previous mobility procedures, i.e. intra MME/S4-SGSN TAU/RAU and the change has not been reported to the PGW yet.  - TAU/RAU procedure as part of the optional network triggered service restoration procedure with ISR, as specified by 3GPP TS 23.007 [17]. | Serving Network  (NOTE 15) | 0 |
| CO | This IE shall also be included on the S4/S11 interface during a TAU/RAU/Handover with MME/SGSN change if the source MME/SGSN has set the SNCR bit in the Change to Report Flags IE in the Forward Relocation Request or Context Response message. |
| CO | This IE shall be included on S5/S8 if the SGW receives this IE from MME/SGSN and if ISR is not active.  This IE shall be included on S5/S8 if the SGW receives this IE from MME/SGSN and ISR is active and the Modify Bearer Request message needs to be sent to the PGW as specified in the 3GPP TS 23.401 [3]. |
| RAT Type | C | This IE shall be sent on the S11 interface for a TAU with a RAT type change, UE triggered Service Request or an I-RAT Handover.  This IE shall be sent on the S4 interface for a RAU with MME interaction, a RAU with an SGSN change, a UE Initiated Service Request or an I-RAT Handover.  This IE shall be sent on the S5/S8 interface if the RAT type changes. | RAT Type | 0 |
| CO | If SGW receives this IE from MME/SGSN during a TAU/RAU/Handover with SGW change procedure, the SGW shall forward it across the S5/S8 interface to PGW. See NOTE 10.  If any condition for including the RAT Type over S5/S8 is met (e.g. the RAT type changes), and if the LTE-M RAT type or Satellite related RAT type is received from the MME, the SGW shall signal the following RAT type to the PGW:   * LTE-M RAT type, if LTE-M RAT type is received and the 'LTE-M RAT type reporting to PGW' flag is received from the MME; or the WB-E-UTRAN RAT type, otherwise. * Satellite related RAT type, if Satellite related RAT type is received and the 'Satellite RAT Type reporting to PGW Indication' flag is received from the MME; or the RAT type without Satellite, i.e. LTE-M / EUTRAN-NB-IoT / WB-E-UTRAN, otherwise.   See NOTE 26. |
| CO | The IE shall be sent on the S11/S4 interface during the following procedures:  - an inter MME TAU or inter SGSN RAU when UE was ISR activated which is indicated by ISRAU flag.  - TAU/RAU procedure as part of optional network triggered service restoration procedure with ISR, as specified by 3GPP TS 23.007 [17].  If ISR is active, this IE shall also be included on the S11 interface in the S1-U GTP-U tunnel setup procedure during an intra-MME intra-SGW TAU procedure. |
| CO | The MME shall set the RAT type to LTE-M, if the eNodeB indicated this is an LTE-M UE and the LTE-M RAT Type has not been reported yet to the SGW. |
| CO | The MME shall set the RAT type to LTE-M Satellite related RAT type, if the eNodeB indicated this is an LTE-M UE accessing satellite E-UTRAN and the LTE-M Satellite related RAT Type has not been reported yet to the SGW. |
| Indication Flags | C | This IE shall be included if any one of the applicable flags is set to 1.  Applicable flags are:   * Idle mode Signalling Reduction Activation Indication: This flag shall be set to 1 on S4/S11 interface, if the ISR is established between the MME and the S4 SGSN. * Handover Indication: This flag shall be set to 1 on the S4/S11 and S5/S8 interfaces during a Handover from Trusted or Untrusted Non-3GPP IP Access to E-UTRAN or a Handover from Trusted or Untrusted Non-3GPP IP Access to UTRAN/GERAN procedures. * Direct Tunnel Flag: This flag shall be set to 1 on the S4 interface, if Direct Tunnel is used. * Change Reporting Support Indication: shall be set to 1 on S4/S11, S5/S8 interfaces, if the SGSN/MME supports location Info Change Reporting and if the SGSN/MME's operator policy permits reporting of location change to the operator of the PGW with which the session is established. This flag should be ignored by SGW if no message is sent on S5/S8. See NOTE 4. * CSG Change Reporting Support Indication: shall be set to 1 on S4/S11, S5/S8, if the SGSN/MME supports CSG Information Change Reporting and if the SGSN/MME's operator policy permits reporting of the CSG Information change to the operator of the PGW with which the session is established. This flag shall be ignored by SGW if no message is sent on S5/S8. See NOTE 4. * Change F-TEID support Indication: This flag shall be set to 1 on S4/S11 for an IDLE state UE initiated TAU/RAU procedure to allow the SGW changing the GTP-U F-TEID. * Propagate BBAI Information Change:  The MME/SGSN shall set this flag to 1 on S11/S4 in procedures without MME/SGSN change if the PGW has requested H(e)NB information reporting and the H(e)NB local IP address or UDP port number information from H(e)NB in UE associated S1/Iu signalling has changed.  (NOTE 8) The MME/SGSN shall set this flag to 1 on S11/S4 during TAU/RAU/Handover with MME/SGSN change procedures if the PGW has requested H(e)NB information reporting. See 3GPP TS 23.139 [51]. * CS to PS SRVCC indication: This flag shall be set to 1 on S4/S11 and on S5/S8 during UTRAN/GERAN to E-UTRAN/UTRAN (HSPA) SRVCC procedure as specified in 3GPP TS 23.216 [43]. * Change of Location Information Indication (CLII): This flag shall be set to 1 on S4/S11 interface only when the ISR is active for the UE. This flag shall be set to 1 by the MME/S4-SGSN if the ULI IE is included in the Modify Bearer Request message and the location information has changed since last reported by the MME/S4-SGSN. See NOTE 9. . * PDN Pause Support Indication: this flag shall be set to 1 on the S5/S8 interface during the TAU/RAU/handover with SGW relocation procedures if the new SGW supports the PGW Pause of Charging procedure. * PDN Pause On Indication: this flag shall be set to 1 on the S5/S8 interface if the SGW requests the PGW to pause the charging for the PDN connection as specified in 3GPP TS 23.401 [3]. (NOTE 13). * PDN Pause Off Indication: this flag shall be set to 1 on the S5/S8 interface if the SGW requests the PGW to unpause the charging for the PDN connection as specified in 3GPP TS 23.401 [3]. (NOTE 13). * Change of Presence Reporting Area information Indication (CPRAI): this flag shall be set to 1 on the S4/S11 interface if ISR is active for the UE and if the Presence Reporting Area Information IE is included in the Modify Bearer Request message and the Presence Reporting Area information has changed since last reported by the MME/S4-SGSN. See NOTE 9. * P-CSCF Restoration Indication: this flag shall be set to 1 on the S11/S4 and S5/S8 interfaces, for the IMS PDN connection, if the MME/S4-SGSN has received the indication from the HSS that a P-CSCF restoration is required for this user. * UE Available for Signalling Indication: this flag shall be set to 1 on S11/S4 by the MME/SGSN during a TAU/RAU or a Service Request procedure for E-UTRAN/UTRAN, or UE initiated Connection Resume procedure for E-UTRAN, or at receipt of an uplink LLC PDU for user data or any valid LLC frame serving as a paging response for GERAN, if the PDN connection is delay tolerant and if there is pending network initiated PDN connection signalling. The SGW shall include this IE on S5/S8 if it receives the flag from the MME/SGSN. * S11-U Tunnel Flag: this flag shall be set to 1 on the S11 interface if user data is transported in NAS signalling. * Extended PCO Support Indication: this flag shall be set to 1 on S11 interface by the MME if the UE and the MME support ePCO. This flag shall be set to 1 on S5/S8 interface by the SGW if the SGW support ePCO and the MME has set the flag to 1 over the S11 interface. See NOTE 18. * NBIFOM Support Indication: this flag shall be set to 1 on S11/S4 during an inter-PLMN mobility procedure for E-UTRAN/UTRAN if the MME/SGSN supports NBIFOM. This flag shall be set to 1 on S5/S8 during an inter-PLMN mobility procedure for E-UTRAN/UTRAN if both the SGW and the MME/SGSN support NBIFOM. See NOTE 19. * eNB Change Reporting Support Indication: shall be set to 1 on S11, S5/S8 interfaces, if the MME supports location Info Change Reporting and if the MME's operator policy permits reporting of location change to the operator of the PGW with which the session is being established. See NOTE 21. * LTE-M RAT Type reporting to PGW Indication: this flag shall be set to 1 on S11, based on operator policy or roaming agreements (for Home Routed PDN connections), if the SGW needs to forward the LTE-M RAT type to the PGW. * MTEDTA (MT-EDT Applicable): this flag shall be set to "1" on the S11 interface if MT-EDT is applicable to the PDN connection; * MTEDTN (MT-EDT NOT Applicable): this flag shall be set to "1" on the S11 interface if MT-EDT is not applicable to the PDN connection; * Restoration of PDN connections after an PGW-C/SMF Change Support Indication: This flag shall be set to 1 by the MME on the S11 interface, during an 5GS to EPS handover using N26 interface, if the MME supports the Restoration of PDN connections after an PGW-C/SMF Change procedure as specified in clause 31 of 3GPP TS 23.007 [17]. This flag shall be set to 1 by the SGW on the S5/S8 interface if the SGW supports the supports the Restoration of PDN connections after an PGW-C/SMF Change procedure as specified in clause 31 of 3GPP TS 23.007 [17] and if the SGW received the same flag in the Create Session Request message or Modify Bearer Request, during an 5GS to EPS Idle mode mobility using N26 interface or during an 5GS to EPS handover using N26 interface. * UPIPSI (User Plane Integrity Protection Support Indication): this flag shall be set to 1 by the MME on the S11 interface, if the UE, MME and E-UTRAN supports User Plane Integrity Protection with EPS. This flag shall be set to 1 by the SGW on S5/S8 interface if the MME has set the flag to 1 over the S11 interface. See NOTE 18. * Satellite RAT Type reporting to PGW Indication: this flag shall be set to 1 on S11, based on operator policy or roaming agreements (for Home Routed PDN connections), if the SGW needs to forward the Satellite related RAT type to the PGW. | Indication | 0 |
| Sender F-TEID for Control Plane | C | The new MME/SGSN shall include this IE on the S11 and S4 interfaces for a TAU/RAU/ Handover with an MME/SGSN change and without any SGW change. See NOTE 10.  If the SGW receives this IE and if it finds that its value is the same as the earlier received value of this IE for this UE, it should interpret this to mean that the MME/SGSN has not changed.  The new SGW shall include this IE on the S5 and S8 interfaces for a TAU/RAU/Handover with a SGW change. See NOTE 10.  If the PGW receives this IE and if it finds that its value is the same as the earlier received value of this IE for this PDN connection, it should interpret this to mean that the SGW has not changed. | F-TEID | 0 |
| Aggregate Maximum Bit Rate (APN-AMBR) | C | The APN-AMBR shall be sent for TAU/RAU/Handover from the Gn/Gp SGSN to the S4 SGSN/MME procedures. | AMBR | 0 |
| Delay Downlink Packet Notification Request | C | his IE shall be sent on the S11 interface for a UE triggered Service Request and UE initiated Connection Resume procedures. It shall contain the delay the SGW shall apply between receiving downlink data and sending Downlink Data Notification for all UEs served by that MME (see clause 5.3.4.2 of 3GPP TS 23.401 [3]). | Delay Value | 0 |
| CO | This IE shall be sent on the S4 interface for a UE triggered Service Request. It shall contain the delay the SGW shall apply between receiving downlink data and sending Downlink Data Notification for all UEs served by that SGSN (see clause 5.3.4.2 of 3GPP TS 23.401 [3]). |
| Bearer Contexts to be modified | C | This IE shall be sent on the S4/S11 interface and S5/S8 interface, except   * on the S5/S8 interface for a UE triggered Service Request and UE initiated Connection Resume procedures. * on the S5/S8 interface for a TAU/RAU/HO without SGW change procedure. See NOTE 10. . * on the S5/S8 interface when requesting the PGW to pause or unpause charging for the PDN connection. * on the S5/S8 interface for any other procedure without SGW change which requires to send a Modify Bearer Request to the PGW, e.g. HSS-based P-CSCF restoration for 3GPP access, reporting of UE presence in a Presence Reporting Area, implicit resume of suspended bearers.   (see NOTE 6).  When Handover Indication flag is set to 1 (i.e., for a Handover from Trusted or Untrusted Non-3GPP IP Access to E-UTRAN or a Handover from Trusted or Untrusted Non-3GPP IP Access to UTRAN/GERAN procedures), the PGW shall ignore this IE. See NOTE 1.  Several IEs with the same type and instance value may be included as necessary to represent a list of Bearers to be modified.  During a TAU/RAU/Handover procedure with an SGW change, the SGW includes all bearers it received from the MME/SGSN (Bearer Contexts to be created, or Bearer Contexts to be modified and also Bearer Contexts to be removed) into the list of 'Bearer Contexts to be modified' IEs, which are then sent on the S5/S8 interface to the PGW (see NOTE 2, see NOTE 10).  During an E-UTRAN Initiated E-RAB modification procedure the MME shall send a Modify Bearer Request, including all the bearers (those modified and those not modified), per PDN connection for which at least one bearer has changed. See NOTE 11. | Bearer Context | 0 |
| Bearer Contexts to be removed | C | This IE shall be included on the S4 and S11 interfaces for the TAU/RAU/Handover, UE initiated Connection Resume and Service Request procedures where any of the bearers existing before the TAU/RAU/Handover procedure, UE initiated Connection Resume and Service Request procedures will be deactivated as consequence of the TAU/RAU/Handover procedure, UE initiated Connection Resume and Service Request procedures. See NOTE 3 and NOTE 6.  For each of those bearers, an IE with the same type and instance value, shall be included.  See NOTE 11. | Bearer Context | 1 |
| Recovery | C | This IE shall be included if contacting the peer for the first time | Recovery | 0 |
| UE Time Zone | CO | This IE shall be included by the MME/SGSN on the S11/S4 interfaces if the UE Time Zone has changed in the case of TAU/RAU/Handover or UE initiated Service Request procedure. See NOTE 5. | UE Time Zone | 0 |
| CO | This IE shall also be included on the S4/S11 interface during a TAU/RAU/Handover with MME/SGSN change if the source MME/SGSN has set the TZCR bit in the Change to Report Flags IE in the Forward Relocation Request or Context Response message. |
| C | If SGW receives this IE, SGW shall forward it to PGW across S5/S8 interface. |
| MME-FQ-CSID | C | This IE shall be included by MME on S11 and shall be forwarded by SGW on S5/S8 according to the requirements in 3GPP TS 23.007 [17]. | FQ-CSID | 0 |
| SGW-FQ-CSID | C | This IE shall be included by SGW on S5/S8 according to the requirements in 3GPP TS 23.007 [17]. | FQ-CSID | 1 |
| User CSG Information (UCI) | CO | The MME/SGSN shall include this IE for Handover procedures, UE initiated Connection Resume and UE-initiated Service Request procedure if the PGW/PCRF has requested CSG Info reporting and the MME/SGSN support the CSG information reporting and the User CSG information has changed (i.e. the UE is accessed via a new CSG cell or hybrid cell or leaves a CSG or hybrid cell).  In TAU/RAU procedure without SGW change, this IE shall also be sent if the PGW/PCRF has requested CSG info reporting and MME/SGSN supports CSG info reporting and the User CSG information has changed (i.e. the UE is accessed via a new CSG cell or hybrid cell or leaves a CSG or hybrid cell) when UE requested to activate E-RAB for all the active EPS bearers in TAU procedure or to keep the Iu connection after the completion of the RAU procedure. See NOTE 5. See NOTE 10. See NOTE 16.  The SGW shall include this IE on S5/S8 if it receives the User CSG Information from MME/SGSN.  See NOTE 15. | UCI | 0 |
| UE Local IP Address | CO | If the UE local IP Address has changed, the ePDG shall include this IE on S2b interface based on local policy for Fixed Broadband access network interworking (see 3GPP TS 23.139 [51]). | IP Address | 1 |
| UE UDP Port | CO | The ePDG shall include this IE on S2b interface if NAT is detected and UE Local IP Address is present for Fixed Broadband access network interworking (see 3GPP TS 23.139 [51]). | Port Number | 1 |
| MME/S4-SGSN LDN | O | This IE is optionally sent by the MME to the SGW on the S11 interface and by the SGSN to the SGW on the S4 interface (see 3GPP TS 32.423 [44]), when communicating the LDN to the peer node for the first time. | Local Distinguished Name (LDN) | 0 |
| SGW LDN | O | This IE is optionally sent by the SGW to the PGW on the S5/S8 interfaces (see 3GPP TS 32.423 [44]), for inter-SGW mobity, when communicating the LDN to the peer node for the first time. | Local Distinguished Name (LDN) | 1 |
| H(e)NB Local IP Address | CO | The MME/SGSN shall include this IE on S11/S4 interface if the PGW/PCRF has requested H(e)NB information reporting and the MME/SGSN has received this information from H(e)NB in UE associated S1/Iu signalling (see 3GPP TS 23.139 [51]).  The SGW shall forward this IE on S5/S8 interface if it is received from the MME/SGSN and   * the Modify Bearer Request message needs to be sent to the PGW as specified in the 3GPP TS 23.401 [3]; or * the Propagate BBAI information change flag is received from the MME/SGSN.   (NOTE 7) | IP Address | 0 |
| H(e)NB UDP Port | CO | The MME/SGSN shall include this IE on S11/S4 interface if the PGW/PCRF has requested H(e)NB information reporting and the MME/SGSN has received this information from H(e)NB in UE associated S1/Iu signalling (see 3GPP TS 23.139 [51]).  The SGW shall forward this IE on S5/S8 interface if it is received from the MME/SGSN and   * the Modify Bearer Request message needs to be sent to the PGW as specified in the 3GPP TS 23.401 [3]; or * the Propagate BBAI information change flag is received from the MME/SGSN.   (NOTE 7) | Port Number | 0 |
| MME/S4-SGSN Identifier | CO | If the PGW triggered SGW restoration procedure is supported, the MME/S4-SGSN shall include this IE on S11/S4 interface and the SGW shall forward this IE on S5 interface in the existing signalling as specified in 3GPP TS 23.007 [17].  If the overload control feature is supported by the MME/S4-SGSN and is activated for the PLMN to which the PGW belongs(see clause 12.3.11), the MME/S4-SGSN shall include this IE on the S11/S4 interface during mobility procedures with MME/S4-SGSN change. | IP Address | 2 |
| CO | If the overload control feature is supported by the SGW and if the currently serving MME/S4-SGSN has provided this IE (in this message or in earlier message), the SGW shall include this IE on the S5/S8 interface and shall set it to the last received value of the serving MME/S4-SGSN identity. |
| CN Operator Selection Entity | CO | In shared networks, the SGSN shall include this IE on the S4 interface for the RAU procedure, if the information is available, and if the Serving Network IE is present in the message or if the CN Operator Selection Entity has changed, to indicate whether the Serving Network has been selected by the UE or by the network. | CN Operator Selection Entity | 0 |
| CO | The SGW shall include this IE on S5/S8 if it receives it from the SGSN. |
| Presence Reporting Area Information | CO | The MME/SGSN shall include this IE:  - if the PGW/PCRF/OCS has just requested to start or modify reporting changes of UE presence in a Presence Reporting Area and the MME/SGSN supports such reporting. The MME/SGSN shall then indicate whether the UE is inside or outside the newly started or modified Presence Reporting Area(s), or indicate the Presence Reporting Area(s) is inactive. Several IEs with the same type and instance value may be included as necessary to represent a list of Presence Reporting Area Information. One IE shall be included for each Presence Reporting Area newly started or modified.  The MME/SGSN shall also include this IE in the following procedures, if the PGW/PCRF requested to report changes of UE presence in a Presence Reporting Area and the MME/SGSN supports such reporting:  - TAU/RAU/Handover procedures without SGW change and with MME/SGSN change and S1-based handover procedure with SGW change. The MME/SGSN shall then indicate whether the UE is inside or outside the Presence Reporting Area(s) for each of the active Presence Reporting Area(s), or indicate that the Presence Reporting Area(s) is inactive. Several IEs with the same type and instance value may be included as necessary to represent a list of Presence Reporting Area Information.  - TAU/RAU/Handover/Cell Update procedures without MME/SGSN change, UE initiated Connection Resume and UE-initiated Service Request procedure if the UE enters or leaves the Presence Reporting Area(s). Several IEs with the same type and instance value may be included as necessary to represent a list of Presence Reporting Area Information. One IE shall be included for each active Presence Reporting Area that the UE has newly entered or left. See NOTE 5, NOTE 10.  - UE initiated Service Request, if ISR is active;  See NOTE 22. | Presence Reporting Area Information | 0 |
| CO | When ISR is not active, the SGW shall include this IE(s) on S5/S8 if it receives the Presence Reporting Area Information from MME/SGSN.  When ISR is active, the SGW shall include this IE(s) on S5/S8 if it receives the Presence Reporting Area Information from MME/S4-SGSN and  - the RAT Type has changed since last reported; or  - the CPRAI flag has been set to 1. |
| MME/S4-SGSN's Overload Control Information | O | During an overload condition, the MME/S4-SGSN may include this IE on the S11/S4 interface if the overload control feature is supported by the MME/S4-SGSN and is activated for the PLMN to which the PGW belongs (see clause 12.3.11).  When present, the MME/S4-SGSN shall provide only one instance of this IE, representing its overload information. | Overload Control Information | 0 |
| CO | If the SGW receives this IE and if it supports the overload control feature, it shall forward it to the PGW on the S5/S8 interface. |
| SGW's Overload Control Information | O | During an overload condition, the SGW may include this IE over the S5/S8 interface if the overload control feature is supported by the SGW and is activated for the PLMN to which the PGW belongs (see clause 12.3.11).  When present, the SGW shall provide only one instance of this IE, representing its overload information. | Overload Control Information | 1 |
| ePDG's Overload Control Information | O | During an overload condition, the ePDG may include this IE over the S2b interface if the overload control feature is supported by the ePDG and is activated for the PLMN to which the PGW belongs (see clause 12.3.11).  When present, the ePDG shall provide only one instance of this IE, representing its overload information. | Overload Control Information | 2 |
| Serving PLMN Rate Control | CO | The MME shall include this IE on the S11 interface if the Serving PLMN Rate is changed.  The target MME shall also include this IE on the S11 interface during an Inter-MME mobility procedure if the Serving PLMN Rate control is configured, and if the configured value is different from the one received from the old MME.  See NOTE 20.  The SGW shall include this IE on S5/S8 if it receives this IE from MME via the Create Session Request or the Modify Bearer Request message. | Serving PLMN Rate Control | 0 |
| MO Exception Data Counter | CO | The MME shall include this IE on the S11 interface when it needs to send a non-zero counter value for the MO Exception Data Counter. The timestamp in the counter shall be set with the time at which the counter value increased from 0 to 1. | Counter | 0 |
| CO | The SGW shall include this IE on S5/S8 if it has received the counter from the MME. |
| IMSI | O | The MME/SGSN should include the IMSI if available. See NOTE 23. | IMSI | 0 |
| User Location Information for SGW | CO | The MME/SGSN shall include this IE on the S11/S4 interface, based on operator policy for the User Location Information to be sent to the SGW, if the user location information to be passed to the SGW is not already reported in the ULI IE in this message.  When present, this IE shall include the ECGI, TAI, eNodeB ID, RAI and/or RNC-ID, based on local policy.  See NOTE 25. | ULI | 1 |
| WLAN Location Information | CO | This IE shall be included on the S2b interface, during a UE initiated IPsec tunnel update procedure, if the WLAN Location Information is available. | TWAN Identifier | 0 |
| WLAN Location Timestamp | CO | This IE shall be included on the S2b interface, during a UE initiated IPsec tunnel update procedure, if the WLAN Location Timestamp is available. | TWAN Identifier Timestamp | 0 |
| Secondary RAT Usage Data Report | CO | If the PLMN has configured secondary RAT usage reporting, the MME shall include this IE on the S11 interface if it has received Secondary RAT usage data from eNodeB in an X2-based handover without Serving GW relocation, S1-based handover without MME or SGW relocation, or E-UTRAN initiated E-RAB modification procedure.  The MME shall also include this IE on the S11 interface if it has received a Secondary RAT Usage Data Report from the source MME in an S1-based handover with MME relocation procedure.  For S1-based handover with SGW relocation, the MME shall also set the IRSGW flag to "0", to indicate that the Secondary RAT usage data is reported for the Source SGW, and sent via the Target SGW to the PGW.  Several IEs with the same type and instance value may be included, to represent multiple usage data reports. | Secondary RAT Usage Data Report | 0 |
| PSCell ID | CO | The MME shall include this IE on the S11 interface, if it has received this information from the eNodeB. | PSCell ID | 0 |
| Private Extension | O |  | Private Extension | VS |
| NOTE1: This requirement is introduced for backwards compatibility reasons. If Bearer Contexts to be modified IE(s) is received in the Modify Bearer Request message, the PGW shall include corresponding Bearer Contexts modified IE(s) in the Modify Bearer Response message.  NOTE2:According to the description in 3GPP TS 23.401 [3] e.g. clause 5.3.3.1 "Tracking Area Update procedure with Serving GW change" and 3GPP TS 23.060 [35], during a TAU/RAU/Handover procedure with an SGW change, if the SGW receives 'Bearer Context to be removed' IEs, the SGW shall allocate the S5/8-U SGW F-TEID for those bearers and include also these bearers in the 'Bearer contexts to be modified' IE, which is then sent within this message on the S5/S8 interface to the PGW.  NOTE3:The 'Bearer Contexts to be removed' IE signals to the SGW that these bearers will be removed by the MME/SGSN later on by separate procedures (e.g. MME/S4-SGSN initiated Dedicated Bearer Deactivation procedure). Therefore, the SGW will not delete these bearers during the ongoing TAU/RAU/Handover procedure (without an SGW change), a Handover procedure (with an SGW change except for an X2-Handover), an UE initiated Connection Resume and a Service Request procedure.  NOTE 4: 3GPP TS 23.401 [3] (e.g. clause 5.3.2.1) and 3GPP TS 23.060 [35] (e.g. clause 9.2.2.1) defines the MME/SGSN shall send the MS Info Change Reporting Support Indication to the PGW. In such case MME/SGSN shall use the Change Reporting Support Indication and/or CSG Change Reporting Support Indication (whichever is applicable), even if stage 2 refers to MS Info Change Reporting Support Indication.  NOTE 5: In TAU/RAU procedure, if the UE requested to activate E-RAB for all the active EPS bearers in TAU procedure or to keep the Iu connection after the completion of the RAU procedure, the User Location Info/User CSG Information/UE Time Zone/Presence Reporting Area Information shall not be sent in S1-U GTP-U tunnel setup procedure during the TAU procedure when the "active flag" is set (see 3GPP TS 24.301 [23] and 3GPP TS 23.401 [3]) or in the Service Request procedure after the completion of the RAU procedure.  NOTE 6: 3GPP TS 23.401 [3] specifies that the target MME/SGSN (for a handover with MME/SGSN change and with or without SGW change) and the MME/SGSN (for a handover without MME/SGSN change and with SGW change) shall send the Modify Bearer Request message to the SGW in the S1 based handover/ Inter RAT handover for an unaccepted PDN Connection when at least one PDN Connection of the UE was accepted by the RAN. In this case, the (target) MME shall indicate the reserved IP address to the SGW in the S1 eNodeB F-TEID and the (target) SGSN shall indicate the reserved IP address to the SGW in the S12 RNC F-TEID for all the non GBR bearers of the unaccepted PDN Connection in the Bearer Contexts to be modified IE. An implementation may provide the mentioned reserved IP address e.g. from one of the reserved IP address ranges (see RFC5735 or <http://www.iana.net/assignments/ipv4-address-space/ipv4-address-space.xml>), or the IP address may be provisioned by a configuration. The (target) MME/SGSN shall indicate all the GBR bearers of the unaccepted PDN connection in the Bearer Contexts to be removed IE.  NOTE 7: This IE is sent on S11/S4 in the specified conditions regardless of whether the H(e)NB local IP address and UDP port number information has changed or not to enable the SGW to propagate this IE in Modify Bearer Request over S5/S8 when required for reasons other than reporting a change in the H(e)NB local IP address and UDP port number information.  NOTE 8: H(e)NB local IP address and UDP port number information changes when the UE moves from an (e)NB to an H(e)NB, or from one H(e)NB to another H(e)NB with a change in the fixed network backhaul, or from one H(e)NB to a (e)NB.  The SGW shall send a Modify Bearer Request on S5/S8 if any of the following condition is met:  a) the Propagate BBAI Information Change flag is received from the MME/SGSN;  b) ISR is active and the RAT type has changed.  NOTE 9: When ISR is active, the CLII and CPRAI flags allow the SGW to avoid sending Modify Bearer Request message over S5/S8 interface during UE-initiated Service Request procedure, when the ULI IE and/or the Presence Reporting Area Information IE is included over S11/S4 Modify Bearer Request message but the location information and/or the Presence Reporting Area information and the RAT Type has not changed since last reported by the SGW.  NOTE 10: The RAU/TAU/Handover procedure which requires an SGW selection for the first time, e.g. a Gn/Gp SGSN to an S4 SGSN/MME RAU/TAU/Handover procedure, shall be handled in a similar manner to the RAU/TAU/Handover with an SGW change procedure.  NOTE 11: The Bearer Context to be modified IE and Bearer Context to be removed IE, together, shall contain all the bearers belonging to the given PDN connection with each bearer appearing in only one of these IEs. See clause 14 for the cases when a Bearer Context mismatch is detected.  NOTE 12: The conditions of presence of the IEs in the Modify Bearer Request for the MME and S4-SGSN triggered Serving GW relocation (see clause 5.10.4 of 3GPP TS 23.401 [3] and clause 9.2.2.4 of 3GPP TS 23.060 [35]) are identical to those specified respectively for X2 handover with SGW relocation and for Enhanced Serving RNS Relocation with SGW relocation.  NOTE 13: If this flag is set in the message, the PGW shall not interpret the absence of other IEs (e.g. MME-FQ-CSID, H(e)NB Local IP Address) as bearing any significance. The message may contain either the PDN Pause On Indication or the PDN Pause Off Indication, not both.  NOTE 14: During the TAU/RAU/Handover from Gn/Gp SGSN, the target MME/S4-SGSN can not derive the level of support for User Location Change Reporting and/or CSG Information Change Reporting at the source Gn/Gp SGSN.  NOTE 15: In shared networks, when the message is sent from the VPLMN to the HPLMN, the PLMN ID that is communicated in this IE shall be that of the selected Core Network Operator for supporting UEs, or that of the allocated Core Network Operator for non-supporting UEs. As an exception, based on inter-operator roaming/sharing agreement, if the information on whether the UE is a supporting or non-supporting UE is available, the PLMN ID that is communicated to the HPLMN for non-supporting UEs shall be the Common PLMN ID.  In shared networks, when the MME/S4-SGSN and PGW pertain to the same PLMN, the Primary PLMN ID shall be communicated in the ECGI to the PGW, and the Common PLMN ID shall be communicated in SAI/CGI to the PGW, for both supporting and non-supporting UEs. The Core Network Operator PLMN ID (selected by the UE for supporting UEs or allocated by the network for non-supporting UEs) shall be communicated in the TAI, RAI, UCI and the Serving Network. See clause 4.4 of 3GPP TS 23.251 [55].  NOTE 16: If the UE initiates a TAU or RAU procedure back to the old MME/old S4 SGSN before completing the ongoing TAU or RAU procedure and the UE is not accessed via a CSG cell or hybrid cell, the old MME/old S4-SGSN shall treat this case as the UE leaves a CSG or hybrid cell.  NOTE 17: The MME/S4-SGSN may be configured to defer the reporting of ULI change until an E-RAB, RAB or user plane is established. In that case, the MME/S4-SGSN shall not send a Modify Bearer Request, unless this is required for other reasons, during TAU/RAU without MME/SGSN change or Service Request (for UTRAN) procedures not requesting to activate data radio bearer(s). For GERAN, the SGSN shall defer the reporting of ULI changes, if so configured in the SGSN, until receipt of an uplink LLC PDU for user data or any valid LLC frame serving as a paging response. The MME/S4-SGSN shall report ULI changes as soon as detected if it is not configured to defer the reporting of ULI changes until an E-RAB, RAB or user plane is established, or if an E-RAB, RAB or user plane is established.  NOTE 18: During an Inter-MME/SGSN and Intra-SGW mobility procedure, if the SGW detects that the support of ePCO or User Plane Integrity Protection (i.e. UPIPSI flag) has changed, e.g. when the source MME supports ePCO or User Plane Integrity Protection while the target MME does not support it, the SGW shall trigger a Modify Bearer Request without setting the EPCOSI flag or the UPIPSI flag respectively if the Modify Bearer Request message is not sent due to other reasons. The PGW shall interpret that ePCO or User Plane Integrity Protection is not supported for this PDN Connection.  NOTE 19: The MME/SGSN or SGW reporting this indication to the PGW during an inter-PLMN procedure does not trigger any extra signalling.  NOTE 20: The MME can set the Control Plane Only Indication only during a PDN connection creation procedure, and the Serving PLMN Rate Control is only applicable to the PDN connection with Control Plane Only Indication set. During an inter MME without SGW relocation procedure, when the source MME has not set the Control Plane Only Indication, and the target MME supports only the Control Plane CIoT Optimizations, then the target MME shall not include the Serving PLMN Rate Control IE as the PDN connection cannot be changed to Control Plane Only. During an inter MME without SGW relocation procedure, when the source MME has set the Control Plane Only Indication and included Serving PLMN rate control IE in the Context Response message, and the target MME supports both the Control Plane CIoT Optimisation and the establishment of the User Plane, the target MME cannot stop the Serving PLMN Rate Control, i.e. the PGW will continue to enforce Serving PLMN Rate Control as the Control Plane Only Indication for this PDN connection cannot be changed during this mobility procedure.  NOTE 21: An MME which supports eNB Change Reporting shall also support Change reporting and therefore shall set both the Change Report Supporting indication and the eNB Changing Reporting Support Indication.  NOTE 22: Upon inter MME/SGSN mobility, the target MME/SGSN shall report Presence Reporting Area Information for all the active and inactive PRAs requested by the PGW. Upon intra MME/SGSN mobility, the MME/SGSN shall only report active PRAs whose Presence Reporting Area Information is changed, e.g. from inside to outside, or vice versa.  NOTE 23: The PGW should use the IMSI or the MEI to verify if the Modify Bearer Request message is received for the right UE context. In some error scenarios, e.g. when a delete bearer request (to delete a PDN connection) is lost over S5/S8, the PGW can receive the Modify Bearer Request message for the hanging PDN connection from the MME/SGSN and SGW, if the PGW has reassigned the F-TEID of the hanging PDN connection for another UE.  NOTE 24: The eNB Change Reporting feature should be supported homogeneously across all MMEs in the network. Otherwise the PGW would not be notified about the change of support of eNB Change Reporting when the UE moves from an MME supporting eNB Change Reporting to an MME that does not support eNB Change Reporting.  NOTE 25: This information is used for the SGW-U selection (see Annex B.2 of 3GPP TS 29.244 [80]).  NOTE 26: If the LTE-M Satellite related RAT type is received from the MME, the SGW shall send the LTE-M RAT type to the PGW if the 'Satellite RAT Type reporting to PGW Indication' is not received and the 'LTE-M RAT Type reporting to PGW Indication' is received, or the SGW shall send the WB-E-UTRAN RAT type to the PGW if both of the indications are absent. | | | | |

Table 7.2.7-2: Bearer Context to be modified within Modify Bearer Request

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octets 1 |  | Bearer Context IE Type = 93 (decimal) |  |  |
| Octets 2 and 3 |  | Length = n |  |  |
| Octets 4 |  | Spare and Instance fields |  |  |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| EPS Bearer ID | M | See NOTE 1, NOTE 2. | EBI | 0 |
| S1 eNodeB F-TEID | C | This IE shall be sent on the S11 interface if the S1-U is being used:   * for an E-UTRAN initial attach; * for a Handover from Trusted or Untrusted Non-3GPP IP Access to E-UTRAN; * for an UE triggered Service Request; * for an UE initiated Connection Resume procedure; * in all S1-U GTP-U tunnel setup procedure during a TAU procedure (see 3GPP TS 24.301 [23]) /handover cases; * in all procedures where the UE is already in ECM-CONNECTED state, e.g. E-UTRAN Initiated E-RAB modification procedure, possibly HSS-based P-CSCF restoration for 3GPP access. See NOTE 4; * in the Establishment of S1-U bearer during Data Transport in Control Plane CIoT EPS optimisation procedure. See NOTE 7.   If an MME is aware that the eNodeB supports both IP address types, the MME shall send both IP addresses within an F-TEID IE. If only one IP address is included, then the SGW shall assume that the eNodeB does not support the other IP address type.  See NOTE 2, NOTE 5, NOTE 6. | F-TEID | 0 |
| S5/8-U SGW F-TEID | C | This IE shall be sent on the S5/S8 interfaces for a Handover or a TAU/RAU with a SGW change. | F-TEID | 1 |
| S12 RNC F-TEID | C | If available, this IE shall be included if the message is sent on the S4 interface if S12 interface is being used. If an S4-SGSN is aware that the RNC supports both IP address types, the S4-SGSN shall send both IP addresses within an F-TEID IE. If only one IP address is included, then the SGW shall assume that the RNC does not support the other IP address type.  See NOTE 2, NOTE 6. | F-TEID | 2 |
| S4-U SGSN F-TEID | C | If available, this IE shall be included if the message is sent on the S4 interface, if S4-U is being used. If an S4-SGSN supports both IP address types, the S4-SGSN shall send both IP addresses within an F-TEID IE. If only one IP address is included, then the SGW shall assume that the S4-SGSN does not support the other IP address type. See , NOTE 6. | F-TEID | 3 |
| S11-U MME F-TEID | CO | This IE shall be sent on the S11 interface if S11-U is being used, i.e. for the following procedures:   * Mobile Originated Data transport in Control Plane CIoT EPS optimisation with P-GW connectivity * Mobile Terminated Data Transport in Control Plane CIoT EPS optimisation with P-GW connectivity * in all procedures where the S11-U tunnel is already established, e.g. when reporting a change of User Location Information. * TAU/RAU with SGW change procedure and data forwarding of DL data buffered in the old SGW (see clause 5.3.3.1A of 3GPP TS 23.401 [3]) for a Control Plane Only PDN connection. See NOTE 6.   This IE may also be sent on the S11 interface, if S11-U is being used, during a E-UTRAN Tracking Area Update without SGW Change, if the MME needs to establish the S11-U tunnel.  See NOTE 8. | F-TEID | 4 |
| NOTE 1: If only EPS Bearer ID IE is included in the Bearer Context to be modified IE during the TAU/RAU without SGW change procedure, the SGW shall remove the stored SGSN/RNC/eNodeB/MME userplane F-TEID locally.  NOTE 2: When Direct Tunnel is used in 3G, e.g. during a Service Request procedure if the UE requests to establish a partial set of radio access bearers and if the SGSN accepts it, or during an SRNS relocation procedure with some bearer contexts being preserved, the SGSN shall provide EBI(s) without S12 RNC F-TEID(s) for these bearer context(s) without corresponding radio access bearer(s) being established. The SGW shall be able to handle these bearer context(s). However, in earlier releases this behaviour may not be supported by the SGW and hence for such SGW, the SGSN shall provide EBI together with S12 RNC F-TEID for each of the bearer context(s) in the Bearer Context to be modified IE.  NOTE 3: It is not possible to establish or release a partial set of radio access bearers in E-UTRAN. The MME shall provide in the Bearer Contexts to be modified IE, for a UE entering or being in CONNECTED state, the EBI together with the S1 eNodeB F-TEID for all the bearers of the PDN connection affected by the Modify Bearer Request other than those possibly indicated in the Bearer Context to be removed IE.  NOTE 4: When the PCO-based extension of the HSS based P-CSCF restoration for 3GPP access is supported as specified in clause 5.4.3 of 3GPP TS 23.380 [61], the MME shall store the S1 eNodeB F-TEID(s) of the IMS PDN connection for UEs with an IMS PDN connection in ECM-CONNECTED state, so that the MME can include all the S1 eNodeB F-TEID(s) of the IMS PDN connection for such a UE in ECM-CONNECTED state in the Modify Bearer Request message.  NOTE 5: When the PCO-based extension of the HSS based P-CSCF restoration for 3GPP access is supported as specified in clause 5.4.3 of 3GPP TS 23.380 [61], the S4-SGSN shall store the S12 RNC F-TEID(s) (if Direct Tunneling is used) for all the bearers of the IMS PDN connection with corresponding radio access bearers established, for UEs with an IMS PDN connection in PMM-CONNECTED state, so that the S4-SGSN can include all the S4-U SGSN F-TEID(s) (if Direct Tunneling is not used) or S12 RNC F-TEID(s) (if Direct Tunneling is used) for all the bearers of the IMS PDN connection with corresponding radio access bearers established, for such a UE in PMM-CONNECTED state in the Modify Bearer Request message.  NOTE 6: During a TAU/RAU with SGW change procedure and data forwarding of DL data buffered in the old SGW (see clause 5.3.3.1A of 3GPP TS 23.401 [3]), the old MME/SGSN shall provide the old SGW with the Forwarding F-TEID received in the Context Acknowledge message (or in the SGSN Context Acknowledge message when a Gn/Gp SGSN is involved) and encode it as either an: - eNB F-TEID for a PDN connection not established with the CPOPCI flag set to 1 (for an old MME), - S11-U MME F-TEID for a PDN connection established with the CPOPCI flag set to 1 (for an old MME), or  - S12 RNC F-TEID or S4-U SGSN F-TEID (for an old SGSN),  regardless of the interface type set in the F-TEID received from the new MME/SGSN. This is to make the downlink data forwarding appear as a regular downlink data transmission for the old SGW, i.e. like a Service Request procedure.  NOTE 7: In the Establishment of S1-U bearer during Data Transport in Control Plane CIoT EPS optimisation procedure (see clause 5.3.4B.4 of 3GPP TS 23.401 [3]), the MME may send a Modify Bearer Request to the SGW, to request the establishment of the S1-U bearers, without sending a prior Release Access Bearers Request to tear down the S11-U bearers. In this case, the MME shall encode the bearers being switched from S11-U to S1-U in the Bearer Contexts to be modified IE and the SGW shall release the S11-U bearers upon receipt of the Modify Bearer Request requesting the establishment of the S1-U bearers.  NOTE 8: All the SGi PDN connections of a UE in E-UTRAN shall either use S11-U or S1-U bearers at any point in time. If S11-U is used, the MME shall establish the S11-U bearer of all the UE's SGi PDN connections. | | | | |

Table 7.2.7-3: Bearer Context to be removed within Modify Bearer Request

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octets 1 |  | Bearer Context IE Type = 93 (decimal) |  |  |
| Octets 2 and 3 |  | Length = n |  |  |
| Octets 4 |  | Spare and Instance fields |  |  |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| EPS Bearer ID | M |  | EBI | 0 |

Table 7.2.7-4: Overload Control Information within Modify Bearer Request

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octet 1 |  | Overload Control Information IE Type = 180 (decimal) |  |  |
| Octets 2 and 3 |  | Length = n |  |  |
| Octet 4 |  | Spare and Instance fields |  |  |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| Overload Control Sequence Number | M | See clause 12.3.5.1.2.1 for the description and use of this parameter. | Sequence Number | 0 |
| Overload Reduction Metric | M | See clause 12.3.5.1.2.3 for the description and use of this parameter. | Metric | 0 |
| Period of Validity | M | See clause 12.3.5.1.2.2 for the description and use of this parameter.  This IE should be set to "0" if the "Overload Reduction Metric" is null. This IE shall be ignored by the receiver if the "Overload Reduction Metric" is null. | EPC Timer | 0 |

\* \* \* Next Change \* \* \* \*

### 7.3.6 Context Response

A Context Response message shall be sent as a response to a previous Context Request message, in the scenarios identified in clause 7.3.5.

Possible Cause values are specified in Table 8.4-1. Message specific cause values are:

- "IMSI/IMEI not known"

- "P-TMSI Signature mismatch"

- "User authentication failed"

- "Target access restricted for the subscriber"

Based on the subscription profile, when the access to the target RAT is prohibited for the subscriber, the old MME/SGSN/AMF may reject the Context Request message with the cause "Target access restricted for the subscriber".

When the source MME/SGSN/AMF supports one or more of the CIoT optimization features as indicated through the CIoT Optimizations Support Indication IE specified in clause 8.125, and if the target node is a MME and the target MME has not set the AWOPDN bit of the CIoT Optimizations Support Indication IE set to 1 in the Context Request message as specified in clause 8.125, the source MME/SGSN/AMF shall reject the Context Request with a cause value of "Request Rejected" under the following conditions (conditions are mutually exclusive):

- If the UE is attached to the source MME/SGSN without any PDN connection through the SGW and PGW and without any SCEF PDN connection;

- if the UE is attached to the source MME/SGSN with only the PDN connection(s) of PDN type "non-IP", through the SGW and the PGW but the UE has not activated any SCEF PDN connection and the target MME/AMF has not set the SGNIPDN bit of the CIoT Optimizations Support Indication IE set to 1 in the Context Request message as specified in clause 8.125;

- if the UE is attached to the the source MME/SGSN with only the SCEF PDN connection(s) but the UE has not activated any PDN connection through the SGW and PGW and the target MME has not set the SCNIPDN bit of the CIoT Optimizations Support Indication IE set to 1 in the Context Request message as specified in clause 8.125;

- if the UE is attached to the source MME/SGSN with only PDN connection(s) of PDN type "non-IP", through the SGW and the PGW and at least one SCEF PDN connection and the target MME has neither set the SGNIPDN bit nor the SCNIPDN bit of the CIoT Optimizations Support Indication IE set to 1 in the Context Request message as specified in clause 8.125;

- if the UE is registered to the source AMF without any PDU session;

- if the UE is registered to the source AMF with only PDU session(s) of type "Unstructured" or "Ethernet", and the target MME has not set the SGNIPDN bit of the CIoT Optimizations Support Indication IE set to 1 in the Context Request message as specified in clause 8.125.

NOTE 2: Among the CIoT optimization features, only the support of SCEF Non-IP PDN connection and the support of SGi Non-IP PDN connection are applicable to a SGSN.

NOTE 3: 5GS supports Attach without PDU session. 5GS can also support Unstructured and Ethernet PDU session types, which are assimilated to "SGi Non-IP PDN connections" over N26 if Ethernet PDN connection type in EPC is not supported; otherwise, the Ethernet PDU session in 5GS can move to EPC seamlessly.

If the target node is a MME and the target MME has not set the ETHPDN bit in the Indication IE to 1 in the Context Request message as specified in clause 8.12, or the target node is a SGSN, the source MME shall reject the Context Request with a cause value of "Request Rejected" if the UE is attached to the source MME with only PDN connection(s) of PDN type "Ethernet".

Table 7.3.6-1 specifies the presence requirements and conditions of the IEs in the message.

Table 7.3.6-1: Information Elements in a Context Response

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| Cause | M |  | Cause | 0 |
| IMSI | C | The IMSI shall be included in the message except for the case:   * If the UE is emergency or RLOS attached and the UE is UICCless.   The IMSI shall be included in the message but not used as an identifier   * if UE is emergency or RLOS attached but IMSI is not authenticated. | IMSI | 0 |
| MME/SGSN/AMF UE MM Context | C | This IE shall be included if the Cause IE has the value " Request Accepted ". | MM Context | 0 |
| MME/SGSN/AMF UE EPS PDN Connections | C | This IE shall be included if there is at least a PDN connection for this UE through the SGW and PGW on the sending MME/SGSN, or if there is at least a PDU session for this UE on the sending AMF.  If the target MME/SGSN/AMF has not set the SGNIPDN bit of the CIoT Optimizations Support Indication IE to 1 in the Context Request, then the source MME/SGSN/AMF shall only include PDN Connections of IP PDN type (if any).  Several IEs with this type and instance values shall be included as necessary to represent a list of PDN Connections. | PDN Connection | 0 |
| Sender F-TEID for Control Plane | C | This IE shall be included if the Cause IE has the value "Request Accepted". | F-TEID | 0 |
| SGW S11/S4 IP Address and TEID for Control Plane | C | This IE shall be included if a SGW is being used by the old MME/SGSN, except if:   * the source and target MME/S4-SGSN support the MME/S4-SGSN triggered SGW restoration procedure, and the source MME/S4-SGSN has not performed the SGW relocation procedure after the source SGW has failed as specified in 3GPP TS 23.007 [17]. * across the S16 interface if there is no active PDP context * across the S10/N26 interface if the UE does not have any PDN connection through the SGW and PGW.   This IE shall not be included by an old AMF. | F-TEID | 1 |
| SGW node name | C | This IE identifies the SGW that was used by the old MME/SGSN and it shall be included by the source MME/S4-SGSN with the following exceptions:   * the source and target MME/S4-SGSN support the MME/S4-SGSN triggered SGW restoration procedure, and the source MME/S4-SGSN has not performed the SGW relocation procedure after the source SGW has failed as specified in 3GPP TS 23.007 [17]. * across the S16 interface if there is no active PDP context * across the S10/N26 interface if the UE does not have any PDN connection through the SGW and PGW.   This IE shall not be included by an old AMF. | FQDN | 0 |
| Indication Flags | C | This IE shall be included if any of the flags are set to 1.  Idle mode Signalling Reduction Supported Indication:   * This flag shall be set to 1 if the Cause IE value indicates "Request accepted" and the old system (including old MME/SGSN and the associated SGW) has the ISR capability.   Unauthenticated IMSI:   * This flag shall be set to 1 if the IMSI present in the message is not authenticated and is for an emergency or RLOS attached UE.   Change Reporting support indication flag:   * This flag shall be set to 1 if the Source S4-SGSN/MME supports Location Change Reporting mechanism. See NOTE 1. See NOTE 2.   CSG Change Reporting support indication flag:   * This flag shall be set to 1 if the Source S4-SGSN/MME supports CSG Information Change Reporting mechanism. See NOTE 1. See NOTE 2.   ISRAU:   * This flag shall be set to 1 on S10/S16 interface if the ISR is activated for the UE before the UE moving to the new SGSN/MME.   Management Based MDT allowed flag:   * This flag shall be set to 1 for the inter-MME TAU procedure over the S10 interface, if Management Based Minimization of Drive Tests (MDT) is allowed. See 3GPP TS 36.413 [10] and 3GPP TS 32.422 [18].   SGW Restoration Needed Indication (SRNI):   * This flag shall be set to 1 if both source and target MME/S4-SGSN support the MME/S4-SGSN triggered SGW restoration procedure and the source MME/S4-SGSN has not performed the SGW relocation procedure after the source SGW has failed as specified in 3GPP TS 23.007 [17].   CSFB Indication (CSFBI):   * when configured to support the return to the last used PLMN after CSFB, the MME shall set this flag to 1 on the S3 interface if the UE has been subject to CSFB recently (see clause 4.3.2 of 3GPP TS 23.272 [21]). See NOTE 4.   Buffered DL Data Waiting Indication (BDWI):   * This flag shall be set to 1 on the S3/S10/S16/N26 interface, during TAU/RAU with or without SGW change procedures or during Idle mode mobility between 5GS and EPS with data forwarding, when it is required to forward to the UE DL data buffered in the (old) SGW or (V-)SMF/UPF, i.e. when the DL Data Buffer Expiration Time has not expired yet in the old MME/SGSN/(V-)SMF, as specified in clause 4.3.17.7 of 3GPP TS 23.401 [3] and in clauses 4.11.1.3.2A, 4.11.1.3.3A, 4.23.12.2a and 4.23.12.3a of 3GPP TS 23.502 [83].   Pending MT Short Message Indication (PMTSMI):   * This flag shall be set to 1 on the S10/S16/S3 interface if the source S4-SGSN/MME knows that there is one (or more) pending MT Short Message(s) in the SMS-GMSC for the UE as specified in clause 10.1 of 3GPP TS 23.040 [75], Figure 17c).   LTE-M UE Indication (LTEMUI):   * This flag shall be set to 1 if the MME/AMF knows that the UE is an LTE-M UE.   Return Preferred Indication (REPREFI):   * the MME or the AMF may set this flag to 1 on the N26 interface to indicate a preferred return of the UE to the last used EPS or 5GS PLMN (respectively) at a later access change to an EPS or 5GS shared network. See NOTE 4. | Indication | 0 |
| Trace Information | C | This IE shall be included over S10/S16/S3 when session trace is active for this IMSI/IMEI. | Trace Information | 0 |
| HRPD access node S101 IP address | C | This IE shall be included only if the HRPD pre registration was performed at the old MME | IP-Address | 0 |
| 1xIWS S102 IP address | C | This IE shall be included only if the 1xRTT CS fallback pre registration was performed at the old MME | IP-Address | 1 |
| Subscribed RFSP Index | CO | This IE shall be included by the MME/SGSN/AMF, if received from the HSS or UDM. | RFSP Index | 0 |
| RFSP Index in Use | CO | This IE shall be included by the MME/SGSN/AMF, if it supports the feature. | RFSP Index | 1 |
| UE Time Zone | CO | When available, this IE shall be included by the source MME/S4-SGSN/AMF. | UE Time Zone | 0 |
| MME/S4-SGSN LDN | O | This IE is optionally sent by the MME/S4-SGSN to the peer MME/S4-SGSN on the S3/S10/S16 interfaces (see 3GPP TS 32.423 [44]), when communicating the LDN to the peer node for the first time. | Local Distinguished Name (LDN) | 0 |
| MDT Configuration | CO | This IE shall be sent by the source MME to the target MME on the S10 interface for inter-MME TAU procedure, if the Job Type indicates Immediate MDT. See 3GPP TS 32.422 [18] clause 4.4. | MDT Configuration | 0 |
| SGSN node name | CO | This IE shall be sent by the old SGSN on the S3 interface if both old SGSN and associated SGW support ISR. See NOTE 3. | FQDN | 1 |
| MME node name | CO | This IE shall be sent by the old MME on the S3 interface if both old MME and associated SGW support ISR. See NOTE 3. | FQDN | 2 |
| User CSG Information (UCI) | CO | This IE shall be sent by the source MME/S4-SGSN on the S3/S10/S16 interfaces if the source MME/SGSN has reported to the PGW that the UE is in a CSG or hybrid cell. It shall then contain the last User CSG information that the source MME/S4-SGSN has reported to the PGW.  The absence of this IE indicates that the UE has not been reported to the PGW as being in a CSG or hybrid cell.  See NOTE 5. | UCI | 0 |
| Monitoring Event Information | CO | This IE shall be sent by the source MME/S4-SGSN on the S3/S10/S16 interfaces if monitoring events are to be continued in the target MME/S4-SGSN.  More than one IE with this type and instance values may be included to represent multiple monitoring events. | Monitoring Event Information | 0 |
| Monitoring Event Extension Information | CO | This IE shall be sent by the source MME/S4-SGSN on the S3/S10/S16 interfaces if monitoring event extensions are to be sent to the target MME/S4-SGSN.  More than one IE with this type and instance values may be included to represent multiple monitoring event extensions. | Monitoring Event Extension Information | 0 |
| UE Usage Type | CO | This IE shall be set to the subscribed UE Usage Type, if received from the HSS, and sent by the old MME/SGSN on the S3/S10/S16 interfaces if the old MME/SGSN supports the Dedicated Core Networks feature specified in TS 23.401 [3].  This IE shall be set to the subscribed UE Usage Type, if received from the UDM, and sent by the old AMF on the N26 interface.  If the UE Usage Type is not available in the old MME/SGSN/AMF, the length field of this IE shall be set to 0.  See NOTE 6. | Integer Number | 0 |
| MME/SGSN UE SCEF PDN Connections | C | This IE shall be included if there is at least one SCEF PDN connection for this UE at the source MME/SGSN and if the target MME/SGSN has set the SCNIPDN bit of the CIoT Optimizations Support Indication IE to 1 in the Context Request as specified in clause 8.125.  Several IEs with this type and instance values shall be included as necessary to represent a list of SCEF PDN Connections. | SCEF PDN Connection | 0 |
| RAT Type | CO | This IE shall be included by the source MME, SGSN or AMF on the S10, S16, S3 and N26 interface to indicate the old RAT type where the UE was camping. See NOTE 7. | RAT Type | 0 |
| Serving PLMN Rate Control | CO | This IE shall be included by the old MME on the S10 interface if such Serving PLMN Rate control was enabled when there is at least one SGi or SCEF PDN connection with the Control Plane Only Indication set. See NOTE 8. | Serving PLMN Rate Control | 0 |
| MO Exception Data Counter | CO | This IE shall be included on the S10 interfaces if the source MME has not yet reported a non-zero MO Exception Data Counter to the PGW. The timestamp in the counter shall be set with the time at which the counter value increased from 0 to 1. | Counter | 0 |
| Remaining Running Service Gap Timer | CO | This IE shall be included on the S10 interface if the source MME has started a Service Gap Timer which has not expired yet, as specified in clauses 5.3.3.1 and 5.3.3.2 in 3GPP TS 23.401 [3].  The value of the IE indicates the remaining time before the Service Gap Timer expires in number of seconds. See NOTE 9. | Integer Number | 1 |
| Extended Trace Information | C | This IE shall be included over N26 when session trace is active for this user. | Extended Trace Information | 0 |
| Subscribed Additional RRM Policy Index | CO | This IE shall be included by the MME over the S10 interface if received from the HSS. | Additional RRM Policy Index | 0 |
| Additional RRM Policy Index in Use | CO | This IE shall be included by the MME over the S10 interface if the feature is supported by the MME. | Additional RRM Policy Index | 1 |
| IWK SCEF ID for Monitoring Event | CO | This IE shall be included on the S3/S10 interface if the source MME/SGSN has selected the IWK-SCEF to relay Monitoring Events. | Node Identifier | 0 |
| Alternative IMSI | CO | This IE shall be included by the old MME over the S10 interface if it has stored an Alternative IMSI as specified in TS 23.401 [3] clause 5.7.2. | Alternative IMSI | 0 |
| Private Extension | O |  | Private Extension | VS |
| NOTE 1: 3GPP TS 23.401 [3] (e.g. clause 5.3.2.1) and 3GPP TS 23.060 [35] (e.g. clause 9.2.2.1) defines the MME/SGSN shall send the MS Info Change Reporting Support Indication to the PGW. In such case MME/SGSN shall use the Change Reporting Support Indication and/or CSG Change Reporting Support Indication (whichever is applicable), even if stage 2 refers to MS Info Change Reporting Support Indication.  NOTE 2: The receiver shall ignore the per UE Change Reporting Support Indication and CSG Change Reporting Support Indication flags, as included within the Indication Flags IE above, if these flags are included per PDN connection i.e. within the Indication Flags IE of the MME/SGSN UE EPS PDN Connections IE.  NOTE 3: According to the 3GPP TS 23.401 [3], during an inter-RAT handover procedure for a UE with ISR activated, the source MME/SGSN should select the ISR associated CN node for this UE as the target CN node for the inter RAT HO when the ISR associated CN node can serve the target access. This parameter is exchanged when ISR is being activated and used in the source MME/SGSN for this decision upon subsequent inter-RAT handover.  NOTE 4: If the SGSN needs to include the last used LTE PLMN ID in the Equivalent PLMN list it sends to the UE (see 3GPP TS 23.272 [21]), the SGSN shall derive the last used LTE PLMN ID from the Old RAI IE received in the RAU request message. If an MME or AMF needs to store the last used 5GS or EPS PLMN ID (respectively), the MME shall derive the last used 5GS PLMN ID from the Old GUTI received in the TAU request message, the AMF shall derive the last used EPS PLMN ID from the 5GS mobile identity received in Registration request message.  NOTE 5: In shared networks, when the message is sent from the VPLMN to the HPLMN, the PLMN ID that is communicated in this IE shall be that of the selected Core Network Operator for supporting UEs, or that of the allocated Core Network Operator for non-supporting UEs. As an exception, based on inter-operator roaming/sharing agreement, if the information on whether the UE is a supporting or non-supporting UE is available, the PLMN ID that is communicated to the HPLMN for non-supporting UEs shall be the Common PLMN ID.  In shared networks, when the MME/S4-SGSN and PGW pertain to the same PLMN, the Primary PLMN ID shall be communicated in the ECGI to the PGW, and the Common PLMN ID shall be communicated in SAI/CGI to the PGW, for both supporting and non-supporting UEs. The Core Network Operator PLMN ID (selected by the UE for supporting UEs or allocated by the network for non-supporting UEs) shall be communicated in the TAI, RAI, UCI and the Serving Network. See clause 4.4 of 3GPP TS 23.251 [55].  NOTE 6: A UE Usage Type IE with the length field equal to 0 is used for the receiver to differentiate the case where the sender does not support the Dedicated Core Network feature from the case where the sender supports the Dedicated Core Network feature but no UE Usage type was received in UE's subscription.  NOTE 7: The old RAT shall be used by the target MME/SGSN to determine if the RAT type has changed and, if so, to decide whether to maintain or deactivate the PDN connections of the UE based on the PDN-Connection-Continuity subscription parameter and operator policy, as specified in 3GPP TS 23.401 [3] and 3GPP TS 23.060 [35]. A target MME shall consider that the RAT type has changed if the target RAT is NB-IoT and a source MME (complying with an earlier version of the specification) does not include the RAT Type IE in the Context Response.  NOTE 8: The target MME may compare the value of the Serving PLMN Rate Control received in the Context Response message with the one configured locally, to determine if such parameter needs to be updated towards the SCEF and/or PGW.  NOTE 9: If the serving MME has changed after the TAU procedure, the target MME shall start Service Gap timer and should use a value that is slightly shorter than the value received in this IE. | | | | |

Table 7.3.6-2: MME/SGSN/AMF UE EPS PDN Connections within Context Response

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octet 1 |  | PDN Connection IE Type = 109 (decimal) |  |  |
| Octets 2 and 3 |  | Length = n |  |  |
| Octet 4 |  | Spare and Instance fields |  |  |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| APN | M |  | APN | 0 |
| APN Restriction | C | This IE denotes the restriction on the combination of types of APN for the APN associated with this EPS bearer Context. The target MME or SGSN determines the Maximum APN Restriction using the APN Restriction.  If available, the source MME/S4 SGSN shall include this IE. | APN Restriction | 0 | |
| Selection Mode | CO | When available, this IE shall be included by the source MME/S4-SGSN/AMF. | Selection Mode | 0 | |
| IPv4 Address | C | This IE shall not be included if no IPv4 Address is assigned. See NOTE 1. See NOTE 5. | IP Address | 0 |
| IPv6 Address | C | This IE shall not be included if no IPv6 Address is assigned. See NOTE 5. | IP Address | 1 |
| Linked EPS Bearer ID | M | This IE identifies the default bearer of the PDN Connection. | EBI | 0 |
| PGW S5/S8 IP Address for Control Plane or PMIP | M | This IE shall include the TEID in the GTP based S5/S8 case and the uplink GRE key in the PMIP based S5/S8 case.  See NOTE 3. | F-TEID | 0 |
| PGW node name | C | This IE shall be included if the source MME, SGSN or AMF has the PGW FQDN. | FQDN | 0 |
| CO | This IE shall be included by the source MME over the N26 interface. See NOTE 6. |
| Bearer Contexts | M | Several IEs with this type and instance values may be included as necessary to represent a list of Bearers. | Bearer Context | 0 |
| Aggregate Maximum Bit Rate (APN-AMBR) | M |  | AMBR | 0 |
| Charging characteristics | C | This IE shall be present if charging characteristics was supplied by the HSS to the MME/SGSN, or by the UDM to the SMF, as a part of subscription information. | Charging characteristics | 0 |
| Change Reporting Action | C | This IE shall be included whenever available at the source MME/SGSN. See NOTE 4. | Change Reporting Action | 0 |
| CSG Information Reporting Action | CO | This IE shall be included whenever available at the source MME/SGSN. | CSG Information Reporting Action | 0 |
| H(e)NB Information Reporting | CO | This IE shall be included whenever available at the source MME/SGSN. | H(e)NB Information Reporting | 0 |
| Indication flags | CO | This IE shall be included if any one of the applicable flags is set to 1.  Applicable flags:   * Subscribed QoS Change Indication: This flag shall be set to 1 if the subscribed QoS profile of the related PDN connection has changed in the old MME/SGSN when the UE is in ECM-IDLE state and ISR is activated. * Change Reporting support indication flag: This flag shall be set to 1 if the source S4-SGSN/MME supports Location Change Reporting mechanism and if the S4-SGSN/MME has indicated the support for the Location Change Reporting mechanism to the PGW, during the session establishment and/or modification procedures. See NOTE 2. * CSG Change Reporting Support Indication flag: This flag shall be set to 1 if the Source S4-SGSN/MME supports CSG Information Change Reporting mechanism and if the S4-SGSN/MME has indicated the support for the CSG Information Change Reporting to the PGW, during the session establishment and/or modification procedures. See NOTE 2. * Pending Subscription Change Indication flag: This flag shall be set to 1 if the source MME has received Subscribed QoS profile updates for QCI/ARP/APN-AMBR from the HSS but has deferred the reporting of these updates to the PGW/PCRF because the UE was not reachable. * Pending Network Initiated PDN Connection Signalling Indication flag: This flag shall be set to 1 by the source MME/SGSN if there is pending network initiated signalling for the PDN connection. * Delay Tolerant Connection Indication flag: This flag shall be set to 1 interface by the source MME/SGSN if the PGW indicated that this PDN Connection is delay tolerant. * Extended PCO Support Indication flag: This flag shall be set to 1 on S10/N26 interface by the source MME if the UE and the source MME support Extended PCO. It shall be set to 1 on the N26 interface during a 5GS to EPS Idle mode mobility. * Control Plane Only PDN Connection Indication: This flag shall be set to 1 if the PDN Connection is set to Control Plane Only. * NO 5GS N26 mobility Indication flag: This flag shall be set to 1 on S10 interface if the PDN connection cannot be moved to 5GS via N26. | Indication | 0 |
| Signalling Priority Indication | CO | The source SGSN/MME shall include this IE if the UE indicated low access priority when establishing the PDN connection. | Signalling Priority Indication | 0 |
| Change to Report Flags | CO | This IE shall be included by the MME/SGSN if any one of the applicable flags is set to 1.  Applicable flags:   * Serving Network Change to Report: This flag shall be set to 1 if the source MME/SGSN has detected a Serving Network change during a TAU/RAU procedure without MME/SGSN change but has not yet reported this change to the PGW. * Time Zone Change to Report: This flag shall be set to 1 if the source MME/SGSN has detected a UE Time Zone change during a TAU/RAU procedure without MME/SGSN change but has not yet reported this change to the PGW. | Change To Report Flags | 0 |
| Local Home Network ID | CO | This IE shall be sent over the S3/S10/S16 interface if SIPTO at the Local Network is active for the PDN connection in the SIPTO at the Local Network architecture with stand-alone GW. | FQDN | 1 |
| Presence Reporting Area Action | CO | This IE shall be included if the PGW requested the source MME/SGSN to report changes of UE presence in a Presence Reporting Area. The source MME/SGSN shall include the Presence Reporting Area Identifier and, if received from the PGW, the list of the Presence Reporting Area elements.  Several IEs with the same type and instance value may be included as necessary to represent a list of Presence Reporting Area Actions. One IE shall be included for each Presence Reporting Area. | Presence Reporting Area Action | 0 |
| WLAN Offloadability Indication | CO | If the MME/SGSN supports WLAN/3GPP Radio Interworking with RAN rules then this IE shall be included on S3/S10/S16 if the UE has been authorized to perform WLAN offload for at least one RAT. | WLAN Offloadability Indication | 0 |
| Remote UE Context Connected | CO | The source MME shall include this IE on the S10 interface during an inter MME mobility procedure if such information is available.  Several IEs with the same type and instance value may be included as necessary to represent a list of remote UEs connected. | Remote UE Context | 0 |
| PDN Type | CO | The source MME/SGSN/AMF shall include this IE on the S10/S3/S16/N26 interface, for a Non-IP or Ethernet PDN Connection, during an inter MME/SGSN/AMF mobility procedure if the new MME/SGSN/AMF supports non-IP or Ethernet PDN connection using SGi as indicated in the Context Request message. | PDN Type | 0 |
| Header Compression Configuration | CO | This IE shall be sent over the S10 interface if the use of IP Header Compression for Control Plane CIoT EPS optimisations has been negotiated with the UE and the target MME has set the IHCSI bit of the CIoT Optimizations Support Indication IE to 1 in the Context Request as specified in clause 8.125. | Header Compression Configuration | 0 |
| PGW Change Info | CO | This IE shall be sent over the S10 interface if available. | PGW Change Info | 0 |
| UP Security Policy | CO | This IE shall be sent by the old MME on the S10 interface or by the old AMF on the N26 interface if this information is available. When present, it shall indicate whether User Plane integrity protection is required, preferred or not needed for the traffic of the PDN connection. | UP Security Policy | 0 |
| NOTE 1: For deferred IPv4 address allocation, if the MME/S4-SGSN receives the PDN address "0.0.0.0" from PGW during "eUTRAN Initial Attach", "PDP Context Activation", "UE requested PDN Connectivity", then the MME/S4-SGSN shall include this IPv4 address "0.0.0.0".  NOTE 2: 3GPP TS 23.401 [3] (e.g. clause 5.3.2.1) and 3GPP TS 23.060 [35] (e.g. clause 9.2.2.1) defines the MME/SGSN shall send the MS Info Change Reporting Support Indication to the PGW. In such case MME/SGSN shall use the Change Reporting Support Indication and/or CSG Change Reporting Support Indication (whichever is applicable), even if stage 2 refers to MS Info Change Reporting Support Indication.  NOTE 3: For PMIP based S5/S8, the 'PGW S5/S8 IP Address and TEID for user plane' IE and the 'PGW S5/S8 IP Address for Control Plane or PMIP' IE shall contain the same uplink GRE key; the Interface Type in these IEs shall be set to the value 9 (S5/S8 PGW PMIPv6 interface).  NOTE 4: The target MME (respectively S4-SGSN) shall ignore this IE if it is received from an S4-SGSN (respectively an MME), i.e. over the S3 interface. In this case, the target serving node shall consider that no ULI change reporting is requested by the PGW for the target RAT, and the PGW shall request the target serving node to start ULI change reporting for the target RAT if so desired.  NOTE 5: For Non-IP or Ethernet PDN connections, neither an IPv4 address nor an IPv6 address shall be present.  NOTE 6: The PGW Node Name is used by the target AMF in the NF Service Discovery procedure to find the combined PGW-C/SMF for the PDU Session during an MME to AMF mobility procedure. | | | | |

The Bearer Context shall be coded as depicted in Table 7.3.6-3.

Table 7.3.6-3: Bearer Context within MME/SGSN/AMF UE EPS PDN Connections within Context Response

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octet 1 |  | Bearer Context IE Type = 93 |  |  |
| Octets 2 and 3 |  | Length = n |  |  |
| Octet 4 |  | Sparae and Instance fields |  |  |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| EPS Bearer ID | M | See NOTE 4. | EBI | 0 |
| TFT | C | This IE shall be present if a TFT is defined for this bearer. | Bearer TFT | 0 |
| SGW S1/S4/S12/S11 IP Address and TEID for user plane | C | The IE shall be present except if:   * the source and target MME/S4-SGSN support the MME/S4-SGSN triggered SGW restoration procedure, and the source MME/S4-SGSN has not performed the SGW relocation procedure after the SGW has failed as specified in 3GPP TS 23.007 [17].   Over the N26 interface, the SMF (on behalf of the source AMF) shall set the IP address and TEID to the following values:  - any reserved TEID (e.g. all 0's, or all 1's);  - IPv4 address set to 0.0.0.0, or IPv6 Prefix Length and IPv6 prefix and Interface Identifier all set to zero.  See NOTE 2, NOTE3 and NOTE 5. | F-TEID | 0 |
| PGW S5/S8 IP Address and TEID for user plane | C | This IE shall be included for GTP based S5/S8. | F-TEID | 1 |
| CO | For PMIP-based S5/S8, this IE shall be included if the PGW provided an alternate address for user plane, i.e. an IP address for user plane which is different from the IP address for control plane.  When present, this IE shall contain the alternate IP address for user plane and the uplink GRE key.  See NOTE 1. |
| Bearer Level QoS | M |  | Bearer QoS | 0 |
| BSS Container | CO | The MME/S4 SGSN shall include the Packet Flow ID, Radio Priority, SAPI, PS Handover XID parameters in the TAU/RAU/Handover procedure, if available. The Container Type shall be set to 2. | F-Container | 0 |
| Transaction Identifier | C | This IE shall be sent over S3/S10/S16 if the UE supports A/Gb and/or Iu mode. | TI | 0 |
| SGW S11 IP Address and TEID for user plane | CO | This IE shall be sent over S3/S10/S16 if the UE supports A/Gb and/or Iu mode. This IE should be sent over N26 if the MME has a TI stored that is linked with this EPS Bearer ID, or, the SMF provides the TI to the AMF (as part of a procedure to deliver SM context to AMF). | F-TEID | 2 |
| NOTE 1: For PMIP based S5/S8, the 'PGW S5/S8 IP Address and TEID for user plane' IE and the 'PGW S5/S8 IP Address for Control Plane or PMIP' IE shall contain the same uplink GRE key; the Interface Type in these IEs shall be set to the value 9 (S5/S8 PGW PMIPv6 interface).  NOTE 2: The MME shall set the interface type in this IE to 1, i.e "S1-U SGW GTP-U interface", for S1-U and S11-U bearers. This is done for backwards compatibility reasons, when the target serving node does not support CIoT optimizations.  NOTE 3: When separate IP address spaces are used for S1-U and S11-U, the MME shall include both S1-U SGW F-TEID in the SGW S1/S4/S12/S11 IP Address and TEID for user plane IE and S11-U SGW F-TEID in SGW S11 IP Address and TEID for user plane, when they are available; otherwise, the source MME shall include the SGW S1/S4/S12/S11 IP Address and TEID for user plane IE, since S1-U and S11-U SGW F-TEID are the same.  NOTE 4: The support of the 15 EPS Bearers shall be homogeneously supported within an MME Pool / SGW serving area. A source MME which supports the 15 EPS Bearers, shall know whether the target MME pool also supports that by local configuration. When the target MME is known to not support the 15 EPS Bearers, the source MME shall only transfer up to 8 EPS bearer contexts with the EBI value set between '5' and '15' to the target MME and shall delete EPS bearer(s) which are not transferred, and if the default bearer is to be deleted, the corresponding PDN connection(s) shall be deleted by the source MME.  NOTE 5: During 5GS to EPS mobility procedures with N26 interface, the source AMF shall transparently transfer the MME/SGSN/AMF UE EPS PDN Connections IE received from the SMF as specified in clause 6.1.6.2.27 of 3GPP TS 29.502[88]. | | | | |

**Table 7.3.6-4: Remote UE Context Connected within MME/SGSN UE EPS PDN Connections within Context Response**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octets 1 |  | Remote UE Context IE Type = 191 (decimal) |  |  |
| Octets 2 and 3 |  | Length = n |  |  |
| Octets 4 |  | Spare and Instance fields |  |  |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| Remote User ID | M | See clause 8.123 for the description and use of this parameter | Remote User ID | 0 |
| Remote UE IP Information | M | See clause 8.124 for the description and use of this parameter | Remote UE IP Information | 0 |

**Table 7.3.6-5: MME/SGSN UE SCEF PDN Connections within Context Response**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octets 1 |  | SCEF PDN Connection IE Type = x (decimal) |  |  |
| Octets 2 and 3 |  | Length = n |  |  |
| Octets 4 |  | Spare and Instance fields |  |  |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| APN | M |  | APN | 0 |
| Default EPS Bearer ID | M | This IE identifies the default bearer of the SCEF PDN Connection. | EBI | 0 |
| SCEF ID | M | This IE shall include the SCEF Identifier and the SCEF Realm for the APN. | Node Identifier | 0 |

Table 7.3.1-6: PGW Change Info with Context Response

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Octet 1 |  | PGW Change Info IE Type = 214 (decimal) |  |  |
| Octets 2 and 3 |  | Length = n |  |  |
| Octet 4 |  | Spare and Instance fields |  |  |
| Information elements | P | Condition / Comment | IE Type | Ins. |
| PGW Set FQDN | CO | This IE shall be included by the source MME if available. | PGW FQDN | 0 |
| Alternative PGW-C/SMF IP Address | CO | This IE shall be included by the source MME if available.  Several IEs with the same type and instance value may be included to represent a list of Alternative PGW-C/SMF IP Addresses. | IP Address | 0 |
| Alternative PGW-C/SMF FQDN | CO | This IE shall be included by the source MME if available.  Several IEs with the same type and instance value may be included to represent a list of Alternative PGW-C/SMF FQDNs. | PGW FQDN | 1 |

\* \* \* Next Change \* \* \* \*

## 8.17 RAT Type

RAT Type is coded as depicted in Figure 8.17-1.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Bits | | | | | | | |  |
|  | Octets | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
|  | 1 | Type = 82 (decimal) | | | | | | | |  |
|  | 2 to 3 | Length = n | | | | | | | |  |
|  | 4 | Spare | | | | Instance | | | |  |
|  | 5 | RAT Type | | | | | | | |  |
|  | 6 to (n+4) | These octet(s) is/are present only if explicitly specified | | | | | | | |  |

Figure 8.17-1: RAT Type

Table 8.17-1: RAT Type values

|  |  |
| --- | --- |
| RAT Types | Values (Decimal) |
| <reserved> | 0 |
| UTRAN | 1 |
| GERAN | 2 |
| WLAN | 3 |
| GAN | 4 |
| HSPA Evolution | 5 |
| EUTRAN (WB-E-UTRAN) | 6 |
| Virtual | 7 |
| EUTRAN-NB-IoT | 8 |
| LTE-M | 9 |
| NR | 10 |
| WB-E-UTRAN(LEO) | 11 |
| WB-E-UTRAN(MEO) | 12 |
| WB-E-UTRAN(GEO) | 13 |
| WB-E-UTRAN(OTHERSAT) | 14 |
| EUTRAN-NB-IoT(LEO) | 15 |
| EUTRAN-NB-IoT(MEO) | 16 |
| EUTRAN-NB-IoT(GEO) | 17 |
| EUTRAN-NB-IoT(OTHERSAT) | 18 |
| LTE-M(LEO) | 19 |
| LTE-M(MEO) | 20 |
| LTE-M(GEO) | 21 |
| LTE-M(OTHERSAT) | 22 |
| <spare> | 23-255 |

NOTE 1: For S4-SGSN, currently it is only possible to detect the difference between GERAN and UTRAN when GERAN Gb mode is used. If GERAN Iu mode is used, then an S4-SGSN may not be able to detect the difference between GERAN and UTRAN. Across the Gb interface, the SGSN may also not be able to detect the difference between GERAN and GAN. If S4-SGSN cannot detect that the HSPA Evolution 3GPP TR 25.999 [46] network is behind the Iu interface, the S4-SGSN will send the "UTRAN" RAT Type.

NOTE 2: For the Iu interface case, if the SGSN detects UTRAN or HSPA, it sets the RAT-Type to "UTRAN". If the SGSN detects HSPA+, it sets the RAT-Type to "HSPA Evolution", otherwise the SGSN will send the "UTRAN" RAT Type.

NOTE 3: The MME sets the LTE-M RAT-Type for a UE accessing E-UTRAN and indicating Category M from the eNB or sets the LTE-M Satellite RAT types for a UE accessing satellite E-UTRAN and indicating Category M from the eNB, as specified in 3GPP TS 23.401 [3].

NOTE 4: The MME sets the RAT-Type to WB-E-UTRAN(LEO) / WB-E-UTRAN(MEO) / WB-EUTRAN(GEO) / WB-E-UTRAN(OTHERSAT) for a UE accessing E-UTRAN with satellite access (EUTRAN-LEO, EUTRAN-MEO, EUTRAN-GEO or EUTRAN-OTHERSAT), and without indicating Category M satellite from the eNB.

NOTE 5: The MME sets the RAT-Type to EUTRAN-NB-IoT(LEO) / EUTRAN-NB-IoT(MEO) / EUTRAN-NB-IoT(GEO) / EUTRAN-NB-IoT(OTHERSAT) for a UE accessing EUTRAN-NB-IoT with satellite access (NBIoT-LEO, NBIoT-MEO, NBIoT-GEO or NBIoT-OTHERSAT).

NOTE 6: The MME sets the RAT-Type to LTE-M(LEO) / LTE-M(MEO) / LTE-M(GEO) / LTE-M(OTHERSAT) for a UE accessing E-UTRAN with satellite access (EUTRAN-LEO, EUTRAN-MEO, EUTRAN-GEO or EUTRAN-OTHERSAT) and indicating Category M satellite from the eNB.

\* \* \* End of Changes \* \* \* \*